

CLAIMS

1. An aminofunctional silicone resin comprising the units:

(R₃SiO_{1/2})_a (i)

(R₂SiO_{2/2})_b (ii)

5 (RSiO_{3/2})_c (iii) and

(SiO_{4/2})_d (iv)

wherein R is independently an alkyl group, an aryl group, or an aminofunctional hydrocarbon group, a has a value of less than 0.4, b has a value of greater than 0.15, c has a value of greater than zero to 0.7, d has a value of less than 0.2, the value of a + b + c + d = 1, with the
10 provisos that 3 to 50 mole percent of silicon atoms contain aminofunctional hydrocarbon groups in units (i), (ii) or (iii), the -NH- equivalent weight of the aminofunctional silicone resin is from 100 to 1500, the aminofunctional silicone resin is in the form of a neat liquid, solution, or meltable solid, greater than 20 weight percent of unit (ii) is present in the aminofunctional silicone resin, less than 10 weight percent of unit (ii) are Me₂SiO_{2/2} units in
15 the aminofunctional silicone resin, and greater than 50 weight percent of silicon-bonded R groups are silicon-bonded aryl groups.

2. An aminofunctional silicone resin comprising the units:

($R_3SiO_{1/2}$)_a (i)

($R_2SiO_{2/2}$)_b (ii)

($RSiO_{3/2}$)_c (iii) and

5 ($SiO_{4/2}$)_d (iv)

wherein R is independently an alkyl group, an aryl group, or an aminofunctional hydrocarbon group, a has a value of less than 0.4, b has a value of greater than 0.15, c has a value of greater than zero to 0.7, d has a value of less than 0.2, the value of $a + b + c + d = 1$, with the provisos that 3 to 50 mole percent of silicon atoms contain aminofunctional hydrocarbon groups in units (i), (ii) or (iii), the $-NH-$ equivalent weight of the aminofunctional silicone resin is from 100 to 1000, the aminofunctional silicone resin is in the form of a neat liquid, solution, or meltable solid, greater than 20 weight percent of unit (ii) is present in the aminofunctional silicone resin, less than 10 weight percent of unit (ii) are $Me_2SiO_{2/2}$ units in the aminofunctional silicone resin, and greater than 50 weight percent of silicon-bonded R groups are silicon-bonded aryl groups.

3. An aminofunctional silicone resin according to Claim 1 or 2 wherein R is independently selected from methyl, phenyl, or an aminofunctional hydrocarbon group having the formula R^1NHR^2 or $-R^1NHR^1NHR^2$ wherein each R^1 is independently a divalent hydrocarbon radical having at least 2 carbon atoms and R^2 is hydrogen or an alkyl group.

4. An aminofunctional silicone resin according to any of Claims 1 - 3 wherein the aminofunctional hydrocarbon groups are selected from -CH₂CH₂NH₂,
-CH₂CH₂CH₂NH₂, -CH₂CHCH₃NH, -CH₂CH₂CH₂CH₂NH₂,
-CH₂CH₂CH₂CH₂CH₂NH₂, -CH₂CH₂CH₂CH₂CH₂CH₂NH₂,
5 -CH₂CH₂NHCH₃, -CH₂CH₂CH₂NHCH₃, -CH₂(CH₃)CHCH₂NHCH₃,
-CH₂CH₂CH₂CH₂NHCH₃, -CH₂CH₂NHCH₂CH₂NH₂,
-CH₂CH₂CH₂NHCH₂CH₂CH₂NH₂, -CH₂CH₂CH₂CH₂NHCH₂CH₂CH₂CH₂NH₂,
-CH₂CH₂NHCH₂CH₂NHCH₃, -CH₂CH₂CH₂NHCH₂CH₂CH₂NHCH₃,
-CH₂CH₂CH₂CH₂NHCH₂CH₂CH₂CH₂NHCH₃, and
10 -CH₂CH₂NHCH₂CH₂NHCH₂CH₂CH₂CH₃.

5. An aminofunctional resin according to Claim 1 or 2 wherein the aminofunctional silicone resin is selected from

aminofunctional silicone resins comprising the units:

- (i) $((\text{CH}_3)_3\text{SiO}_{1/2})_a$
- 5 (ii) $(\text{C}_6\text{H}_5(\text{CH}_3)\text{SiO}_{2/2})_b$
- (iii) $((\text{CH}_3)\text{RSiO}_{2/2})_b$ where $\text{R} = -\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$
- (iv) $(\text{C}_6\text{H}_5\text{SiO}_{3/2})_c$,

aminofunctional silicone resins comprising the units:

- (i) $(\text{C}_6\text{H}_5(\text{CH}_3)\text{SiO}_{2/2})_b$
- 10 (ii) $((\text{CH}_3)\text{RSiO}_{2/2})_b$ where $\text{R} = -\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$
- (iii) $(\text{C}_6\text{H}_5\text{SiO}_{3/2})_c$,

aminofunctional silicone resins comprising the units:

- (i) $((\text{CH}_3)_3\text{SiO}_{1/2})_a$
- (ii) $((\text{CH}_3)\text{RSiO}_{2/2})_b$ where $\text{R} = -\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$
- 15 (iii) $(\text{RSiO}_{3/2})_c$ where $\text{R} = -\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$
- (iv) $(\text{C}_6\text{H}_5\text{SiO}_{3/2})_c$,

aminofunctional silicone resins comprising the units:

- (i) $((\text{CH}_3)_3\text{SiO}_{1/2})_a$
- (ii) $((\text{CH}_3)\text{RSiO}_{2/2})_b$ where $\text{R} = -\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$
- 20 (iii) $(\text{C}_6\text{H}_5\text{SiO}_{3/2})_c$

or

aminofunctional silicone resins comprising the units:

- (i) $((\text{CH}_3)_3\text{SiO}_{1/2})_a$
- (ii) $(\text{C}_6\text{H}_5(\text{CH}_3)\text{SiO}_{2/2})_b$
- 25 (iii) $((\text{CH}_3)\text{RSiO}_{2/2})_b$ where $\text{R} = -\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$
- (iv) $(\text{C}_6\text{H}_5\text{SiO}_{3/2})_c$
- (v) $(\text{SiO}_{4/2})_d$

wherein a, b, c, and d are as defined above.

6. An aminofunctional resin according to Claim 1 or 2 wherein the aminofunctional silicone resin is selected from

aminofunctional silicone resins comprising the units:

- (i) $((\text{CH}_3)_3\text{SiO}_{1/2})_a$
- 5 (ii) $(\text{C}_6\text{H}_5(\text{CH}_3)\text{SiO}_{2/2})_b$
- (iii) $((\text{CH}_3)\text{RSiO}_{2/2})_b$ where $\text{R} = -\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$
- (iv) $(\text{C}_6\text{H}_5\text{SiO}_{3/2})_c$,

aminofunctional silicone resins comprising the units:

- (i) $(\text{C}_6\text{H}_5(\text{CH}_3)\text{SiO}_{2/2})_b$
- 10 (ii) $((\text{CH}_3)\text{RSiO}_{2/2})_b$ where $\text{R} = -\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$
- (iii) $(\text{C}_6\text{H}_5\text{SiO}_{3/2})_c$,

aminofunctional silicone resins comprising the units:

- (i) $((\text{CH}_3)_3\text{SiO}_{1/2})_a$
- (ii) $((\text{CH}_3)\text{RSiO}_{2/2})_b$ where $\text{R} = -\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$
- 15 (iii) $(\text{RSiO}_{3/2})_c$ where $\text{R} = -\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$
- (iv) $(\text{C}_6\text{H}_5\text{SiO}_{3/2})_c$,

aminofunctional silicone resins comprising the units:

- (i) $((\text{CH}_3)_3\text{SiO}_{1/2})_a$
- (ii) $((\text{CH}_3)\text{RSiO}_{2/2})_b$ where $\text{R} = -\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$
- 20 (iii) $(\text{C}_6\text{H}_5\text{SiO}_{3/2})_c$

aminofunctional silicone resin comprising the units

- (i) $((\text{CH}_3)_3\text{SiO}_{1/2})_a$
- (ii) $(\text{CH}_3)_2\text{SiO}_{2/2})_b$
- (iii) $((\text{CH}_3)\text{RSiO}_{2/2})_b$ where $\text{R} = -\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$
- 25 (iv) $(\text{C}_6\text{H}_5\text{SiO}_{3/2})_c$

aminofunctional silicone resin comprising the units:

- (i) $((\text{CH}_3)_2\text{RSiO}_{1/2})_a$ where $\text{R} = -\text{CH}_2(\text{CH}_3)\text{CHCH}_2\text{NHCH}_3$
- (ii) $(\text{CH}_3)_2\text{SiO}_{2/2})_b$
- (iii) $(\text{C}_6\text{H}_5(\text{CH}_3)\text{SiO}_{2/2})_b$
- 5 (iv) $(\text{C}_6\text{H}_5\text{SiO}_{3/2})_c$

aminofunctional silicone resins comprising the units:

- (i) $((\text{CH}_3)_2\text{RSiO}_{1/2})_a$ where $\text{R} = -\text{CH}_2(\text{CH}_3)\text{CHCH}_2\text{NHCH}_3$
- (ii) $(\text{C}_6\text{H}_5(\text{CH}_3)\text{SiO}_{2/2})_b$
- (iii) $(\text{C}_6\text{H}_5\text{SiO}_{3/2})_c$,

10 aminofunctional silicone resins comprising the units:

- (i) $((\text{CH}_3)\text{RSiO}_{2/2})_b$ where $\text{R} = -\text{CH}_2(\text{CH}_3)\text{CHCH}_2\text{NHCH}_3$
- (ii) $(\text{C}_6\text{H}_5(\text{CH}_3)\text{SiO}_{2/2})_b$
- (iii) $(\text{C}_6\text{H}_5\text{SiO}_{3/2})_c$,

aminofunctional silicone resins comprising the units:

- 15 (i) $((\text{CH}_3)_2\text{RSiO}_{1/2})_a$ where $\text{R} = -\text{CH}_2(\text{CH}_3)\text{CHCH}_2\text{NHCH}_3$
- (ii) $(\text{C}_6\text{H}_5(\text{CH}_3)\text{SiO}_{2/2})_b$
- (iii) $(\text{SiO}_{4/2})_d$, or

aminofunctional silicone resins comprising the units:

- (i) $((\text{CH}_3)_3\text{SiO}_{1/2})_a$
- 20 (ii) $(\text{C}_6\text{H}_5(\text{CH}_3)\text{SiO}_{2/2})_b$
- (iii) $((\text{CH}_3)\text{RSiO}_{2/2})_b$ where $\text{R} = -\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$
- (iv) $(\text{C}_6\text{H}_5\text{SiO}_{3/2})_c$
- (v) $(\text{SiO}_{4/2})_d$

wherein a, b, c, and d are as defined above.

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7. An emulsion composition comprising:

- (A) an aminofunctional silicone resin of any of claims 1-6;
- (B) at least one surfactant; and
- (C) water.

8. An emulsion composition according to Claim 7 wherein a has a value of 0.1 to 0.3, b has a value of 0.2 to 0.4, c has a value of 0.2 to 0.5, d has a value of 0, 10 to 30 mole percent of silicon atoms contain aminofunctional hydrocarbon groups in units (i), (ii) or (iii), the -NH- equivalent weight of the aminofunctional silicone resin is from 150 to 350, 20 to 50 weight percent of unit (ii) is present in the aminofunctional silicone resin, 0 to 5 weight percent of unit (ii) are $\text{Me}_2\text{SiO}_{2/2}$ units in the aminofunctional silicone resin, and from 50 to 75 weight percent of silicon-bonded R groups are silicon-bonded aryl groups.

9. An emulsion composition according to Claim 7 or 8 wherein the surfactant is selected from anionic surfactants, cationic surfactants, nonionic surfactants, amphoteric surfactants, or a combination thereof.

10. An emulsion composition according to any of Claims 7-9, wherein the emulsion composition further comprises at least one ingredient selected from fragrances, preservatives, vitamins, ceramides, amino-acid derivatives, liposomes, polyols, botanicals, conditioning agents, glycols, vitamin A, vitamin C, vitamin E, Pro-Vitamin B5, sunscreen agents, humectants, preservatives, emollients, occlusive agents, esters, pigments, or self-tanning agents.

11. An emulsion composition according to any of Claims 8-10, wherein the emulsion is in the form of spray-dried composite particles.